

[0044] The first lens may have a spherical surface. For example, both surfaces of the first lens may be spherical. The first lens may be formed of a material having high light transmissivity and excellent workability. For example, the first lens may be formed of plastic, such as polycarbonate. However, a material of the first lens is not limited to the plastic. For example, the first lens may be formed of glass.

[0045] The second lens may have refractive power. For example, the second lens may have positive refractive power. At least one surface of the second lens may be convex. For example, an image-side surface of the second lens may be convex.

[0046] The second lens may have an aspherical surface. For example, an object-side surface of the second lens may be aspherical. The second lens may be formed of a material having high light transmissivity and excellent workability. For example, the second lens may be formed of plastic, such as polycarbonate. However, a material of the second lens is not limited to the plastic. For example, the second lens may be formed of glass.

[0047] The third lens may have refractive power. For example, the third lens may have positive refractive power. At least one surface of the third lens may be convex. For example, an object-side surface of the third lens may be convex.

[0048] The third lens may have an aspherical surface. For example, an image-side surface of the third lens may be aspherical. The third lens may be formed of a material having high light transmissivity and excellent workability. For example, the third lens may be formed of plastic, such as polycarbonate. However, a material of the third lens is not limited to the plastic. For example, the third lens may be formed of glass.

[0049] The fourth lens may have refractive power. For example, the fourth lens may have negative refractive power. The fourth lens may have a meniscus shape. For example, an image-side surface of the fourth lens may be concave.

[0050] The fourth lens may have an aspherical surface. For example, both surfaces of the fourth lens may be aspherical. The fourth lens may be formed of a material having high light transmissivity and excellent workability. For example, the fourth lens may be formed of plastic, such as polycarbonate. However, a material of the fourth lens is not limited to plastic. For example, the fourth lens may be formed of glass.

[0051] The fifth lens may have refractive power. For example, the fifth lens may have positive refractive power. At least one surface of the fifth lens may be convex. For example, both surfaces of the fifth lens may be convex.

[0052] The fifth lens may have an aspherical surface. For example, both surfaces of the fifth lens may be aspherical. The fifth lens may be formed of a material having high light transmissivity and excellent workability. For example, the fifth lens may be formed of plastic, such as polycarbonate. However, a material of the fifth lens is not limited to the plastic. For example, the fifth lens may be formed of glass.

[0053] In the configurations of the lenses as described above, the second to fifth lenses are arranged in the same direction, while the first lens is arranged in a direction different from the direction in which the second to fifth lenses are arranged. For example, an optical axis of the first lens may be substantially perpendicular to an optical axis of the second lens.

[0054] The filter may filter a partial wavelength from incident light incident through the first to fifth lenses. For example, the filter may filter an infrared wavelength of the incident light.

[0055] The filter may be manufactured to have a thin thickness. To this end, the filter may be formed of plastic.

[0056] The image sensor may be configured to realize high resolution. For example, a unit size of pixels configuring the image sensor may be 1.12 μm or less. The image sensor is disposed in a direction different from the direction in which the second to fifth lenses are disposed. For example, an optical axis of the image sensor is substantially perpendicular to the optical axis of the second lens. The optical axis of the image sensor is substantially parallel to the optical axis of the first lens is disposed. The image sensor may be disposed to be close to an object side. For example, the image sensor is disposed to be closer to the object side, as compared with the second to fifth lenses.

[0057] The stop may be disposed in order to adjust an amount of light incident to the lenses. For example, the stop may be disposed between the second and third lenses.

[0058] The prism is between the first lens and the second lens. The prism refracts incident light from the first lens to the second lens.

[0059] The reflecting member is disposed between the fifth lens and the image sensor. The reflecting member reflects light irradiated from the fifth lens to the image sensor (or the imaging plane).

[0060] In the optical imaging system configured as described above, a distance from the object-side surface of the first lens to the imaging plane may be sufficiently secured, such that an optical design may be free. In addition, the optical imaging system according to one or more embodiments may have an optical axis that is bent, such that the optical imaging system may be mounted in a length direction of an electronic device. Therefore, the optical imaging system according to one or more embodiments may be easily mounted in a thin mobile phone, or other device.

[0061] The optical imaging system satisfies the following Conditional Expressions:

$$D_p/f < 0.5$$

$$N_p < 2.0$$

$$N_f < 1.66$$

$$2.0 < Y_t/BFL$$

$$Y_t/Y < 1.0.$$

[0062] Here, f is an overall focal length of the optical imaging system, D_p is a distance from the object-side surface of the first lens to an image-side surface of the prism, BFL is a distance from an image-side surface of the fifth lens to the imaging plane, N_p is a refractive index of the prism, N_f is a refractive index of the filter, Y_t is a length from the center of the imaging plane to a side of the imaging plane, and Y is $1/2$ of a diagonal length of the imaging plane.

[0063] The optical imaging system satisfying the above Conditional Expressions may be miniaturized, and allow high resolution images to be realized. The optical imaging systems according to one or more embodiments will be described.

[0064] First, an optical imaging system according to a first embodiment will be described with reference to FIG. 1. The